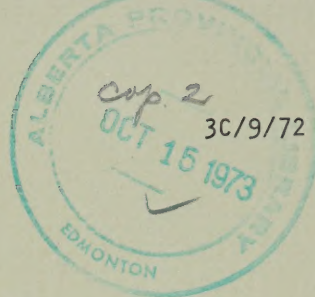
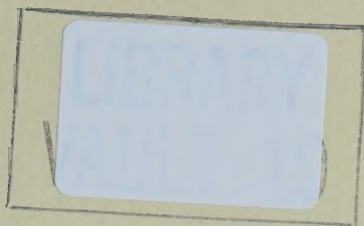


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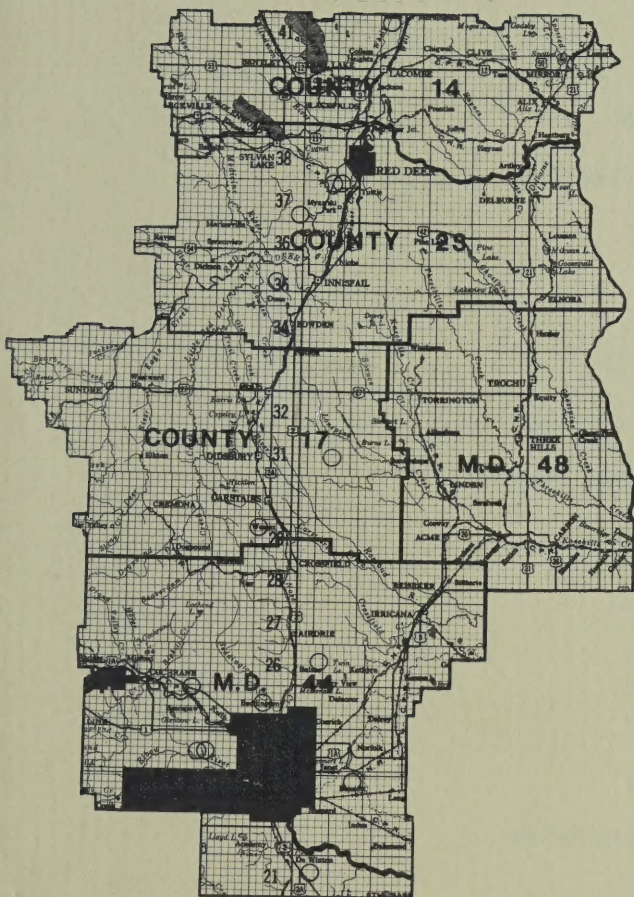
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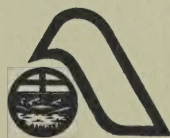
CALGARY DAIRY FARM

BUSINESS SUMMARY

A REPORT
ON
18 SAMPLE DAIRY FARMS
1971



PRODUCTION ECONOMICS BRANCH
MARKET INTELLIGENCE SECTION
MARKETING DIVISION



ALBERTA DEPARTMENT OF AGRICULTURE

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A
REPORT ON
18 SAMPLE DAIRY FARMS

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MARKET INTELLIGENCE SECTION
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ALBERTA
DEPARTMENT OF AGRICULTURE

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INTRODUCTION

In 1971, 18 fluid milk producers out of a total of 260 in the Calgary - Red Deer milkshed provided their records of business for analysis. The farms represented a cross section of the producers based on quota size.

This report contains a summary and analysis of business activities on a group basis in conformation with previous reports. It is intended to supplement computer printouts in the hands of the dairymen with a general comparative analysis, and to provide information to the dairy industry, the Dairy Control Board and to government personnel in the field of farm management.

ACKNOWLEDGEMENTS

Acknowledgement is due to the participating dairymen for providing their records of business and for their very considerable efforts in assisting the fieldmen of the Production Economics Branch in this respect. Thanks are also due to the Dairy Control Board for their assistance, and to the Economic Stimulation Program of the Federal government which helped significantly in the process of gathering the information.

K.D. Porter, Head
Production Economics Branch

DEFINITION OF TERMS

Total Farm - This term includes all enterprises in farm business, and in this report it refers to the income and expenses associated with the total farm operation.

Operating Revenue - Includes cash receipts and the adjustment of crop and livestock inventories less livestock purchased.

Operating Expenses - Are cash expenses plus depreciation, plus an allowance for unpaid family labour exclusive of the operator.

Net Farm Income - Is the difference between Operating Revenue and Operating Expense prior to deducting Capital interest expense and an interest return up to a combined value of 7% of the current equity in the farm.

Labour Income - Is the residual to the operator after deducting the interest on investment.

Labour Earnings - Is the addition of labour income and the value of home-consumed produce, and is the amount forthcoming to the farm operator for his labour and management for the year.

Dairy Enterprise - The Dairy Enterprise, for the purpose of business analysis, is an operating unit in itself which may draw upon other enterprises of the farm for such resources as feed and labour.

Herd Credit - Is the increase or decrease in the value of the dairy herd through sales, purchases, births, natural growth and dairy livestock losses during the year.

Milk Costs Per Hundredweight - This refers to the analysis of costs of production of milk sold to the fluid milk distributing plants.

Return to Management and Profit - Or Return to the Operator's Management and Risk, is the dollar value remaining to the operator after including his labour and interest at 7% on capital as costs of operation.

Value of Production From Dairy - Is the receipts from the sale and personal use of dairy products plus the value of inventory change in feed and dairy cattle less purchase of dairy livestock.

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DEFINITION OF TERMS

Total Variable Costs - Are short-term costs which vary relative to output.

Fixed Costs - Consist of depreciation, interest on investment and such costs as utilities, insurance and taxes.

Total Production Cost - Is the sum of all variable costs, labour and fixed costs.

Unpaid Labour - Consists of the operator's labour and any unpaid labour contributed by the family.

Capital Turnover - Is the number of years required for the value of production or operating revenue to equal the average investment for the year.

OUTLINE OF THE STUDY

The dairy study deals with the economics of fluid milk production at the producer level in three general Alberta areas--Edmonton, Calgary and Lethbridge. An 8.1% sample of the 740 Alberta shippers in these controlled areas submitted business information for the calendar year of 1971. In this year, the Alberta Farm Account Book was most widely used, though other accounting systems favored by individuals were also employed. Assistance was provided in entering data so as to best facilitate computerization. Farmers' records from these books accounted for the basic data for analysis.

Objectives

The purpose of the study is to provide a continuing account of the economic conditions in the production of fluid milk in Alberta for the Dairy Control Board and the milk industry as a whole, and to provide the participating dairy farmers with personal business analyses for management purposes.

Characteristics of the Study

The study was designed to be as representative as possible through selection by area and by quota size, the dairy enterprise being the main source of income on all farms. Crop enterprises are carried on in nearly all the dairy farms and certain dairy farmers have beef enterprises besides. The Alberta Farm Account Book was constructed to accommodate all such enterprises and, to permit ready transformation for computer use.

Report Procedure

Farms were assembled according to their market areas and separate area reports were made. Basic tables on Income and Expense respecting the Total Farm and Dairy Enterprise were first constructed. Management levels were tabulated, followed by auxiliary tables of feed and labour use. An analysis of the key management factors and their effect on the dairy enterprise was made. Comparative tables for farms of low, medium and high productivity were constructed and consolidated Dairy Enterprise statements were made from data from all farms on study.

FARM INCOME AND EXPENSES

Table 1 shows the comparative Income Statements for the Calgary dairy farms on study during 1970 and 1971. Group averages on a per farm basis are used to indicate the outcome of the year's business activities. The Income Statement outlines the income and expenses for the total farm business.

Receipts - The largest cash receipt in 1971 arose from the sale of milk (\$37,755.00), followed by dairy cattle sales and crop sales. The revenue from the first two items provided 90% of the total cash receipts. Other livestock sales were much higher than in 1970. Crop sales contributed 6% and miscellaneous receipts 2%. Expanded milk production and cattle sales in 1971 were reflected in a \$8,997.00 increase in Total Cash Receipts over the previous year.

Inventory Change - The activity in cattle transactions is further noted in purchases of \$4,828.00 of livestock in 1971. Though the crop inventory decreased during the year, the livestock inventory increased causing a net inventory change of \$554.00. This when added to Total Cash Receipts resulted in an Operating Revenue of \$50,634.00.

Expenses - Feed purchases changed little from 1970, but in all other categories cash expenses were higher than in 1970. Because of these various increases the Operating Payments of 1971 exceeded those of 1970 by \$5,556.00. This difference was further enlarged by higher depreciation costs and the added unpaid family labour allocation. While both Operating Expenses and Operating Revenue showed increases in 1971, the final result was an increase of \$3,018.00 in Net Farm Income over that of 1970.

Labour Earnings - Some increase in the average value of capital assets took place in 1971. This was largely due to new acquisitions and partly due to farmers' revisions of land and livestock values. A 7% return on investment in farm assets was applied in the analysis to reflect a reasonable return in that respect. An average expenditure of \$1,775.00 in interest payments was made by farmers in 1971 on capital loans and is included in the Interest on Capital figure in the table. The Operator's Labour Earnings, following the deduction of interest and the addition of perquisites, rose to \$4,505.00 in 1971.

Table 1 INCOME STATEMENT FOR THE TOTAL FARM OPERATION
January 1, 1971 to December 31, 1971

Calgary Whole Milk Farms	Group Average 1970	Group Average 1971	Your Farm		Group Average 1970	Group Average 1971	You Farm
Number of farms ^{a/}	23	18			23	18	
<u>EXPENSES</u>	<u>b/</u>			<u>RECEIPTS</u>			
Feed bought for LS	\$ 3,510	\$ 3,665	\$	Gross milk sales	\$32,018	\$37,755	\$
Auto expenses	336	411		Dairy cattle sales	5,440	7,143	
Tractor expenses	1,067	1,338		Other livestock	372	927	
Truck expenses	706	816		Crop sales	2,415	3,358	
Gen. farm exp. (seed, fert., twine, etc.)	4,714	6,132		Misc. receipts	838	897	
Gen. dairy exp. (vet., milkhouse supplies, etc.)	3,079	3,213		<u>TOTAL CASH</u>			
Annual joint exp. (ins., phone, taxes, elec.)	2,207	2,982		RECEIPTS	41,083	50,080	
Wages paid with board	3,672	5,623					
Hauling & fees off milk cheque	2,242	2,909		Change in Crop Inventory	446	-1,060	
<u>OPERATING PAYMENTS</u>	<u>21,533</u>	<u>27,089</u>		Change in LS Inventory	1,169	6,442	
Add:				Deduct:			
Depreciation on bldgs. & equipment	4,997	6,276		LS Purchases	2,365	4,828	
Unpaid family labour (not incl. operator)	643	1,091		Net Inventory Change	-750	554	
<u>TOTAL OPERATING</u>				<u>OPERATING REVENUE</u>	<u>40,333</u>	<u>50,634</u>	
<u>EXPENSES</u>	<u>27,173</u>	<u>34,456</u>					
Net Farm Income	13,160	16,178					

The Net Farm Income for the groups of farms above represents the Average Net Income per farm. The Net Farm Income is modified by deducting interest on the operator's equity at a rate of 7% and also interest which was paid on farm indebtedness. Long term liabilities were not completely available in 1970, thus now necessitating an adjustment in the amount of interest assessed in the previous year in order to achieve comparability with 1971 figures. The final measure is known as the operator's LABOUR EARNINGS which is the return to the operator for his labour and management and is shown below.

Deduct:		
Int. on capital	\$10,107	\$11,867
LABOUR INCOME	3,053	4,311
Add: Perquisites	85	194
<u>LABOUR EARNINGS^{c/}</u>	<u>\$ 3,138</u>	<u>\$ 4,505</u>

^{a/} Previous year's figures included for comparison.

^{b/} All figures have been rounded to the nearest dollar.

^{c/} Labour Earnings, 1970, Revised.

CALGARY DAIRY ENTERPRISE ANALYSIS

Table 2 summarizes comparative receipts and expenses of the Calgary area farms for 1970 and 1971 in terms of group averages for the dairy enterprise only.^{1/} Receipts included all sales of dairy products and the value of herd credit. In cases where dairy steers were customarily raised for sale they were considered as a beef enterprise and were excluded. The various costs were assembled into four main categories. The value of the operator's labour was included in labour charges in order to be able to arrive at a residual return to management above all costs.

Receipts from the sale of milk in 1971 constituted 80% of total dairy receipts, which were up by \$9,468.00 over the previous year. Herd expansion was reflected in the increased milk sales and large change in the value of herd credit.

Costs rose in every category and amounted to \$41,354.00. They were composed of Feed - 35%, Labour - 19%, Overhead - 25% and Other Costs - 21%. The effect of higher receipts in 1971 was therefore reduced somewhat, though the net returns to management rose to \$4,987.00 in comparison with \$2,628.00 for 1970.

Milk Costs Per Hundredweight

In this section of the table, receipts other than those obtained from the sale of milk to the whole milk plants were eliminated and costs were reduced by the amount of the herd credit so as to arrive at a net return per hundredweight of sales to plants.

On a hundredweight basis, Overhead and Labour Costs increased in 1971. These contributed to a high gross cost of \$6.42, before the deduction of the herd credit which resulted in a net cost of \$5.10. The price of \$5.85 per hundredweight relieved some of the effect of the higher cost in 1971, leaving a return of \$0.75 to management.

Overhead Cost per hundredweight, which has been increasing more rapidly than other cost components, was composed of Buildings and Site - \$0.31, Machinery and Equipment - \$0.15, Feed and Supplies - \$0.01, Cattle and Quota - \$0.52 and Depreciation - \$0.60. These changes combined to lower the effective return to the operator's management.

^{1/} Consolidation of Edmonton, Calgary and Lethbridge--page 16.

Table 2

DAIRY ENTERPRISE COST ANALYSIS

January 1, 1971 to December 31, 1971

	Group Average 1970	Group Average 1971	Your Farm
Calgary Whole Milk Farms			
Number of farms	23	18	
<u>Dairy Receipts Per Farm</u>			
Value of milk sales per farm	\$32,018	\$37,388	\$
Value of milk used in house per farm	106	144	
Value of credits to dairy herd per farm ^{a/}	4,662	8,487	
Value of miscellaneous dairy income	87	322	
Total Receipts	36,873	46,341	
<u>Dairy Costs Per Farm</u>			
Feed cost at farm market value (including pasture)	12,825	14,348	
Labour cost ^{b/}	6,167	7,739	
Overhead cost (depreciation and interest)	7,100	10,248	
Other costs (marketing, milkhouse supplies, etc.)	8,153	9,019	
Total costs	34,245	41,354	
Net amount left for profit and management after charging custom rate per hour for dairy labour	2,628	4,987	
<u>Milk Costs Per Hundredweight Basis</u>			
Feed (including all purchased and home grown and pasture charge)	2.31	2.23	
Labour (dairy share of total farm labour)	1.11	1.20	
Overhead cost (depreciation and interest)	1.28	1.59	
Other costs (marketing, milkhouse supplies, etc.)	1.47	1.40	
Total gross cost per cwt. milk	6.17	6.42	
Credit from herd increase (due to herd growth)	0.84	1.32	
Total net costs per cwt. milk	5.33	5.10	
Average price received per cwt. for all milk sold	5.76	5.85	
Returns to management and profit per cwt. of milk	0.43	0.75	
Net cost per lb. butterfat	1.53	1.46	
Receipts per lb. butterfat	1.65	1.67	
Butterfat test of milk	3.49%	3.50%	

^{a/} Credits to dairy herd are value of herd at the end of the year plus sales of cattle, plus cattle butchered, less value of herd at the beginning of the year and less purchase of cattle. They also include milk fed to calves. For a further explanation of Herd Credit, see Appendix page 3.

^{b/} Represents wages paid for single and married dairy labour. Where no hired help was employed, operator and family labour was entered at the average rate for hired labour.

MANAGEMENT

Dairy Management is concerned with organizing, planning, directing and supervising the business. Dairy farmers carry out these functions and, in many cases, add their own labour. Over the long term, their decisions are made in reference to two conditions--size and intensity. The wide range in size of Alberta dairy herds has persisted for many years. This has not been so much due to entry of small operators as to the decision of existing operators as to how much responsibility they want to assume as managers. Therefore, no individual operation can be selected as a model for all operations. For this reason, a cross section of producing units was used in this study as an indication of "central tendency" and some sub-divisions have been set up to permit comparisons at different size levels.^{1/}

Table 3 shows average levels in the management factors influencing income in 1970 and 1971. The unit factors, per cow, per D.A.U., per hour, per pound and per hundredweight, which measure intensity, are perhaps of more direct interest in individual comparisons, and therefore a number of them are reproduced here.

Livestock - Total milk sales per farm were up in 1971 though production per cow was lower by 400 pounds. Slightly less roughage and grain was consumed per dairy animal unit, and gross returns per \$100 feed fed were higher.

Crops - The yields of barley, oats and roughage were lower than in 1970.

Labour - Total farm operating revenue per man was up, due mostly to the small decrease in man equivalents. The efficiency of dairy labour per hundredweight of milk was maintained in 1971, though the labour cost per hour rose \$0.16. Net returns accruing to management and all labour inputs per hour improved to \$2.86 due to greater output of dairy products.

Capital - Operating revenue from the total farm per \$1,000 of investment remained the same as in 1970.

Size of Business - The average acreage per farm land increased in 1971. The value of both owned and rented capital assets increased also. Nearly all herds increased, some of the larger ones expanding sharply.

^{1/} Comparisons by size, page 15.

Table 3

MANAGEMENT FACTORS AFFECTING INCOME

January 1, 1971 to December 31, 1971

		Group Average 1970	Group Average 1971	Year Farm
Calgary Whole Milk Farms				
Number of farms		23	18	
<u>Livestock</u>				
Milk production per cow (including milk fed to calves and for home use)		(lbs.)	11,298	10,893
Fluid milk sales per farm		(lbs.)	552,081	639,367
Butterfat per cow		(lbs.)	390	381
Butterfat test of milk		(%)	3.49	3.50
Grain & supplement fed per dairy animal unit		(lbs.)	4,590	3,882
Roughage per dairy animal unit		(tons)	3.8	3.6
Gross Returns per \$100 feed fed		(\$)	288	323
<u>Crops</u>				
Yield per acre: Barley		(bus.)	53	42
Oats		(bus.)	78	42
Wheat		(bus.)	36	28
Roughage		(tons)	2.1	1.8
Other Grain		(bus.)	42	38.2
<u>Labour</u>				
Man equivalent per farm		(no.)	2.09	2.46
Operating revenue per man		(\$)	19,322	20,662
Cost of dairy labour per man hour ^{a/}		(\$)	1.58	1.74
Net returns to dairy management & labour/man hour		(\$)	2.26	2.86
Labour per pound of butterfat produced		(hrs.)	0.20	0.19
Hours of labour per 100 pounds of milk produced		(hrs.)	0.69	0.68
Hours per cow equivalent (total herd)		(hrs.)	56	52
<u>Capital</u>				
Operating revenue per \$1,000 of utilized capital		(\$)	224	220
Years for operating revenue to equal utilized capital		(yrs.)	4.5	4.5
<u>Size of Business</u>				
Number of acres owned and rented		(acs.)	598	666
Number of acres owned		(acs.)	409	360
Number of cultivated acres (including summerfallow)		(acs.)	452	548
Owned capital investment		(\$)	143,823	170,658
Rented capital investment		(\$)	36,509	59,501
Number of milk cows (including dry cows)		(no.)	50.3	60.3
Total dairy animal units ^{b/}		(no.)	69.0	86.0
Number of milk cows as percent of total herd in cow equivalent		(%)	73.0	70.0

^{a/} The average rate for all labour charged to dairy chores. This consisted of single and married wages with board. The operator's labour was charged at the going married labour rate.

^{b/} In terms of cow equivalent, i.e. one cow equals 1.5 heifers or 3 calves.

FEED CONSUMPTION AND FEED VALUES

The table below provides some comparative measures between purchased and home grown feed on Calgary study farms for the past two years. During 1971 the farms on study bought 62.5 tons of roughage on the average, for their dairy herds, and used 245 tons of home grown roughage. The value of purchased roughage, which consisted largely of alfalfa or alfalfa mix averaged \$22.44 per ton. The total amount of roughage consumed per dairy enterprise increased from 266 tons in 1970 to 307 tons in 1971. This was due to the increase in herd size on the farms.

In 1971, approximately 28% of the total grain and concentrates fed was purchased. The cost per pound of purchased grain, dairy ration and other concentrates appeared to rise above that of 1970, to 2.99 cents per pound. A high proportion of purchases was dairy supplement. Feed grain was bought around 1.5 cents per pound. The proportion of grain to roughage was 1 pound to 1.7 pounds. The total value of purchased feed per farm amounted to \$4,396.00, which is 33% of total feed costs exclusive of pasture charges and expenses for salt and minerals.

Table 4 DAIRY LIVESTOCK FEED CONSUMPTION AND FEED VALUES

		Group Average 1970	Group Average 1971
<u>Calgary Whole Milk Farms</u>			
Number of farms		23	18
<u>Purchased Roughage Fed</u>			
Average value per farm	(\$)	1,076	1,404
Average tons per farm	(tons)	46.8	62.5
Value per ton	(\$)	26.76	22.44
<u>Home Grown Roughage Fed</u>			
Average value per farm	(\$)	4,786	4,823
Average tons per farm	(tons)	218.9	245
Value per ton	(\$)	21.87	19.68
<u>Purchased Grain and Other Concentrates Fed</u>			
Average value per farm	(\$)	3,014	2,992
Average pounds per farm	(lbs.)	139,904	100,036
Value per pound	(¢)	2.15	2.99
<u>Home Grown Grains Fed</u>			
Average value per farm	(\$)	2,795	3,923
Average pounds per farm	(lbs.)	177,277	254,833
Value per pound	(¢)	1.58	1.54

LABOUR

The kind of labour used on dairy farms varied considerably depending on the size of the operation. On the study farms in 1971 the proportion of hired labour time to total labour was 48% in the Calgary group, 58% in the Lethbridge - Medicine Hat group and 36% in the Edmonton group. In terms of total labour, the value of owned investment per worker averaged \$69,373.00 for Calgary, \$78,411.00 for Lethbridge and \$62,387.00 for Edmonton.

The hired labour was supplemented by family labour under varying arrangements in payment or non-payment depending on circumstances. Casual labour was commonly traded between neighbors or paid for as required.

A distribution of labour in the Calgary group of 18 farms shows the type of labour and wages paid including board which was recorded in 1971. These wages represent payment for work of all kinds which occurs on the farm.

LABOUR RATES

	<u>Hired Labour Per Farm</u>	<u>Hired Labour Total</u>
Months	14.25	256.5
Cost Per Month	\$394.67	\$394.67
Total Cost	\$5,623	\$101,233

For the purpose of attributing a value to all labour on the farm, the farm operators were asked to value their labour at going rates. This was undertaken in order to show its significance in the analysis where returns are attributed to the operator's labour as well as to his equity and his management of the business. In the Calgary study the operator's labour contributions are shown below. Though unpaid family labour did not receive formal wages it was significant in the labour picture. It was evaluated with respect to age and the time involved. The summary is included.

	<u>Operator Labour</u>	<u>Total Operator Labour</u>	<u>Unpaid Family Labour</u>	<u>Total Unpaid Family Labour</u>
Months	11.67	210.0	3.59	64.62
Cost Per Month	\$457.12	\$457.12	\$304.16	\$304.16
Total Cost	\$5,333	\$95,994	\$1,092	\$19,648

RETURN TO UNPAID LABOUR, MANAGEMENT AND INVESTMENT
(61 Alberta Dairy Enterprises)

The total Alberta sample of 61 farms was assembled in Table 5 to compare the level of returns between two major groups. The basis of comparison was the return for the combined items of unpaid labour, management and investment arising out of the dairy enterprise. These components are highly variable between farms, and when the returns to Management is specified as the single outcome, the importance of the other two items is sometimes overlooked.

In Table 5, the return to unpaid labour, management and investment for all farms averaged \$283.00 per cow. The enterprises were arranged in two groups--above and below that level. Thirty-two were above, twenty-nine were below. The accompanying table shows general similarities and some significant differences in the costs and returns for the two groups.

The table shows both groups chosen on this basis as being fairly close to equal size, in the range of \$29,000.00 to \$32,000.00 Value of Production, 550,000 pounds of milk production, 50 milking cows and \$70,000 of investment in the Dairy Operation. However, differences in costs are apparent, and a glance at the per hundredweight costs in the first column will show how these lower costs contributed to the better overall financial returns accompanying them.

Comparisons with the second column of figures will show that every item of expense is lower in the first group. Differences in costs appear in feed - \$0.41, other variable expenses - \$0.30, labour - \$0.12, fixed costs - \$0.15, giving a total cost reduction of \$0.98 per hundredweight.

Considering the relatively large number of farms in each group and the nearly equal size of business, it would appear that these per unit comparisons are good indicators of the expenses dairymen might want to watch. While feed has the greatest bearing on costs, the table shows that each of the items must be given attention by the operator if he wishes to achieve the largest returns from the dairy enterprise. Though lower feed costs accounted for the greatest single reduction in cost, the table indicates that each of the five played an important part in contributing to higher average returns per hundredweight for the first group.

Table 5

RESOURCE COSTS RELATED TO RETURNS TO
UNPAID LABOUR, MANAGEMENT AND INVESTMENT
(61 Alberta Dairy Enterprises)

		Return to Unpaid Labour, Management & Investment Per Cow	
		<u>Over \$283</u>	<u>Under \$283</u>
Number of Farms		32	29
Milk Sales	(\$)	32,107	29,567
Total Value of Production	(\$)	40,919	35,140
Total Cost of Production	(\$)	31,775	34,186
Return to Unpaid Labour, Mgmt. & Invest.	(\$)	18,355	9,711
Return to Management & Risk	(\$)	9,144	954
Receipts Per Cwt. Milk Produced	(\$)	7.01	6.62
Feed Cost Per Cwt.	(\$)	1.94	2.35
Other Variables Per Cwt.	(\$)	0.85	1.15
Labour Per Cwt.	(\$)	1.18	1.30
Fixed Cost Per Cwt.	(\$)	1.48	1.63
Total Production Costs	(\$)	5.45	6.43
Returns to:			
Unpaid Labour, Mgmt. & Invest. Per Cwt.	(\$)	3.14	1.83
Unpaid Labour & Management Per Cwt.	(\$)	2.26	0.92
Operator's Labour & Management Per Cwt.	(\$)	2.14	0.78
Management & Risk Per Cwt.	(\$)	1.56	0.19
Number of Milk Cows	(no.)	50.5	50.1
Total Milk Production	(lbs.)	583,588	531,195
Production Per Cow	(lbs.)	11,560	10,610
Total Investment	(\$)	73,673	69,890
Capital Turnover	(yrs.)	1.80	1.99

FACTOR EFFICIENCY AND RESOURCE USE
(61 Alberta Dairy Enterprises)

On page 7 there were a number of management factors listed which represent averages in the levels of resource use and output on the sample dairy farms in 1971. Each of the participating dairymen in his report will have his comparable figures beside them to which he may relate his own performance. There are ranges above and below average performance, however, that should be given analysis. This has been done by grouping the farms relative to chosen management factors such as those on the following page. The dairy enterprises from all sample farms in Edmonton, Calgary and Lethbridge - Medicine Hat were included in the accompanying analysis.

1. Size may be distinguished physically or financially in respect to either inputs or outputs. Size has been found to have a bearing on success. A large efficient farm may be expected to produce a larger net revenue than a small efficient farm. In regard to a dairy enterprise, the number of cows is a good index of size.

2. Output per cow is a measure of efficiency of herd productivity which should influence the profitability of the enterprise.

3. Sales of milk per \$1,000 of dairy investment shows how well capital is being used and also should be related positively to returns to the operator.

4. Milk production per man equivalent is a measure of labour efficiency.

5. Gross returns over feed fed per cow is a measure of efficiency in the use of feed and normally ought to cause an increase in net returns as the margin increases.

The measurements above are called Efficiency Factors. There are others, but these five are good indicators of success. They have been selected for use in this study.

First, the average levels of performance in the factors was found for the total group of 61 dairy enterprises. The individual enterprises were then divided into above average and below average in reference to the factors. Farms with performance levels which were exactly average were placed alternately in above and below average classifications.

The average factor levels were:

1. The number of cows in the herd 50.3 (cows)
2. Sales of milk per cow 10,791 (lbs.)
3. Sales of milk per \$1,000 of dairy investment . . . 429 (\$)
4. Milk produced per man equivalent 412,066 (lbs.)
5. Gross returns over feed cost per cow 523 (\$)

Table 6 FIVE-FACTOR EFFICIENCY OUTCOMES
(61 Alberta Dairy Enterprises)

Efficiency Factors	Number of Factors Above Average					
	0	1	2	3	4	5
Number of Enterprises	8	16	13	10	8	6
Number of Cows	35	40	40	46	77	90
Milk Sales Per Cow ^{1/} (lbs.)	7,849	9,691	10,025	10,980	12,034	12,800
Milk Sales Per \$1000 Investment ^{1/} (\$)	344	388	411	450	440	508
Milk Produced Per Man Equivalent (lbs.)	238,369	321,769	398,780	449,549	523,951	621,304
Gross Returns Over Feed Cost Per Cow (\$)	377	451	467	559	582	649

^{1/} To fluid milk plants.

Table 6 shows the number of factors above average over each of the five columns, with the highest degree of efficiency related to 5. The number of records associated with each follows, and the factor data is arranged below.

Inspection of the table reveals a clear trend in efficiency in all the items of productivity as one reads from left to right. There were eight instances in the zero class, and six in the class above average in all five factors. The largest group of sixteen enterprises was above average in one factor. The table shows that high performance in one aspect of production is not enough and that such performance should be attempted for all factors, in as far as possible, in order to make the best use of resources.

The factor analysis was carried a step further to ascertain that success in an increasing number of factors was, in fact, accompanied by higher net returns.

Table 7 below relates returns to factor performance.

Table 7

FACTOR EFFICIENCY AND RETURNS
TO THE OPERATOR

(61 Alberta Dairy Enterprises)

<u>Number of Efficiency Factors Above Average</u>	<u>Number of Enterprises</u>	<u>Returns to Unpaid Labour & Management</u>	<u>Operator's Labour Earnings</u>	<u>Returns to Operator's Mgm't & Risk</u>
5	6	\$22,647	\$22,320	\$19,463
4	8	\$13,432	\$13,209	\$10,340
3	10	\$11,045	\$10,666	\$ 7,163
2	13	\$ 7,069	\$ 6,499	\$ 3,398
1	16	\$ 5,357	\$ 4,250	\$ 648
0	8	\$ 3,836	\$ 2,493	-\$ 675

Three stages in returns to the operator were calculated for the 61 dairy enterprises and are set up in the columns as they occurred relative to the five factor performance. The number of factors above average range from high to low in the table with the corresponding returns on the same line.

Returns to Unpaid Labour and Management is the net return to the operator and unpaid family labour, Labour Earnings is the return to the operator's labour and management. Returns to the Operator's Management and Risk is the net to the operator after charging his own labour as a cost of operation.

It can be seen that returns in each column range from high to low, corresponding with the standing in efficiency factors. Thus, in regard to the dairy enterprises forming the study, the operators who were above average in an increasing number of efficiency factors achieved increasingly higher net returns from their businesses.

Table 8

CALGARY DAIRY ENTERPRISE ANALYSIS - BY SIZE

MILK PRODUCTION	LOW (to 379,999 lbs.)		MEDIUM (380,000 to 889,999 lbs.)		HIGH (890,000 to 1,240,000 lbs.)	
Number of Farms	6		6		6	
<u>Enterprise Receipts</u>						
Livestock Receipts	3358.77		5119.20		10955.00	
Livestock Transferred to Other Enterprises	779.17		2553.33		1568.33	
Milk Receipts	17890.72		33508.56		60764.71	
Subsidies and Other Receipts					964.83	
Livestock and Produce Used	253.14		192.81		320.21	
Less Livestock Purchases	2840.83		791.17		10028.83	
Less Livestock Transferred From Other Enterprises			133.33			
Adjustment for Inventory Change	3384.17		-1890.83		13095.83	
Value of Production From Dairy	22825.13		38558.57		77640.06	
<u>Enterprise Costs</u>						
Grain	1141.88 cwt.		2408.10 cwt.		4735.38 cwt.	
Supplement	67.71 cwt.		126.58 cwt.		333.33 cwt.	
Complete Feed	314.47 cwt.		323.83 cwt.		754.00 cwt.	
Roughage-	177.01 tons		268.35 tons		282.33 tons	
Silage			44.33 tons		133.78 tons	
Feed Straw	2.67 tons		2.50 tons		23.50 tons	
Pasture	248.50 AUM		358.17 AUM		214.25 AUM	
Mineral, Salt, Etc.	163.55		168.31		826.96	
Total Feed	7540.34		12730.53		22772.61	
Bedding Straw	236.25		355.73		868.00	
Veterinary and Medicine	337.29		389.73		805.44	
Other Direct Variable Costs	1645.71		3569.72		6821.93	
Allocated Variable Costs	1880.36		1840.29		3673.19	
Total Variable Costs (Excluding Labour)	11659.94		18886.00		34341.16	
Hired Labour	720.00 hrs.		1490.00 hrs.		4125.33 hrs.	
Family Labour	501.67 hrs.		534.00 hrs.		333.00 hrs.	
Operator Labour	2023.50 hrs.		2144.17 hrs.		1477.67 hrs.	
Total Labour	3245.17 hrs.		4168.16 hrs.		5936.00 hrs.	
Utilities and Overhead Costs					10425.13	
Depreciation Charges	1685.79		1048.31		1898.87	
Interest--Buildings and Site (7%)	1562.16		3582.52		6507.45	
Interest--Machinery and Equipment (7%)	1068.27		1773.73		3192.59	
Interest--Feed and Supplies (7%)	454.63		948.90		1499.02	
Interest--Livestock and Quota (7%)	27.17		29.54		40.67	
Total Production Cost	1805.64		2863.66		5388.59	
Return Over Variable Costs	23651.77		36516.54		63893.46	
Return to Unpaid Labour, Investment and Management	11185.18		19672.57		42698.90	
	6647.83		12335.84		27119.93	

Difference in sizes of dairy enterprises are important to the farmers who operate within them. The table above was arranged to assist dairymen to associate their particular size of operation with one of the three above and to be enabled to examine their own in closer reference than could be possible with an all-farms average only. The basis of grouping was by volume of milk production, the total number of enterprises being arranged in order of size and divided into thirds. This procedure was also followed in 1970, thus some comparability is also possible with that year.

Table 9

REGIONAL ENTERPRISE COST COMPARISONS

	Edmonton Group Average 1971	Calgary Group Average 1971	Lethbridge Group Average 1971	All Areas Group Average 1971
Number of farms	36	18	7	61
<u>Dairy Receipts Per Farm</u>				
Value of milk sales	\$24,505	\$37,388	\$47,103	\$30,900
Value of milk used in house	87	144	217	119
Value of credits to dairy herd	5,060	8,487	11,221	6,778
Value of miscellaneous dairy income	452	322	112	375
Total Receipts	\$30,104	\$46,341	\$58,653	\$38,172
<u>Dairy Costs Per Farm</u>				
Feed cost at farm market value (including pasture)	\$ 8,948	\$14,348	\$20,506	\$11,868
Labour cost	5,939	7,739	9,438	6,872
Overhead cost (depreciation & interest)	5,954	10,248	9,313	7,607
Other costs	4,804	9,019	9,398	6,575
Total Costs	\$25,645	\$41,354	\$48,655	\$32,922
Return to Management	4,459	4,987	9,998	5,250
<u>Milk Costs Per Hundredweight Basis</u>				
Feed (purchased, home grown and pasture charge)	\$ 2.07	\$ 2.23	\$ 2.30	\$ 2.17
Labour (dairy share)	1.37	1.20	1.08	1.26
Overhead cost (depreciation & interest)	1.37	1.59	1.03	1.39
Other costs	1.11	1.40	1.07	1.21
Total gross cost per cwt. milk	\$ 5.92	\$ 6.42	\$ 5.48	\$ 6.03
Less credit from herd growth	1.17	1.32	1.28	1.24
Total net costs per cwt. milk	\$ 4.75	\$ 5.10	\$ 4.20	\$ 4.79
Average price received per cwt. for all milk sold	\$ 5.68	\$ 5.85	\$ 5.42	\$ 5.69
Return to management	0.93	0.75	1.22	0.90
Net cost per lb. butterfat	\$ 1.38	\$ 1.46	\$ 1.24	\$ 1.39
Receipts per lb. butterfat	1.65	1.67	1.60	1.65
Butterfat test of milk	3.45%	3.50%	3.40%	3.45%

The table above reproduces the Calgary Dairy Enterprise Cost Analysis from page 5, along with the corresponding tables from the Edmonton and Lethbridge reports. A consolidation of these which include all study farms is shown in the right-hand column.

APPENDIX

Table 1 CHARACTERISTICS OF 61 ALBERTA DAIRY ENTERPRISES
CLASSIFIED BY FEED COSTS PER COW & INVESTMENT PER COW

1971

		Cost of Feed ^{1/} Per Cow		Investment ^{2/} Per Cow	
		Over \$236	Under \$236	Over \$1,429	Under \$1,429
Number of Farms		29	32	32	29
1. Milk Sales	(\$)	37,581	24,845	31,029	30,757
2. Total Value of Production	(\$)	46,986	30,183	38,396	37,924
3. Total Cost of Production	(\$)	40,664	25,904	33,339	32,460
4. Return to Op. Labour & Mgmt.	(\$)	9,660	8,194	8,254	8,777
5. Return to Management & Risk	(\$)	6,322	4,279	5,057	5,464
6. Receipts/Cwt. Milk Produced	(\$)	6.83	6.84	6.89	6.77
7. Feed Cost Per Cwt.	(\$)	2.33	1.83	2.18	2.07
8. Other Variables Per Cwt.	(\$)	1.00	0.96	0.96	1.00
9. Labour Per Cwt.	(\$)	(.64 hr) 1.12	(.85 hr) 1.38	(.71 hr) 1.20	(.75 hr) 1.26
10. Fixed Cost Per Cwt.	(\$)	1.45	1.68	1.63	1.46
11. Total Production Costs	(\$)	5.90	5.87	5.97	5.79
Returns to:					
12. Unpaid Labour, Mgmt. & Invest.	(\$)	2.39	2.78	2.60	3.04
13. Unpaid Labour & Management	(\$)	1.50	1.86	1.61	1.70
14. Operator's Labour & Mgmt.	(\$)	1.40	1.69	1.48	1.57
15. Management & Risk	(\$)	0.93	0.97	0.91	0.97
16. Number of Cows	(\$)	57.5	43.7	47.1	53.8
17. Total Milk Production	(lbs.)	687,872	441,599	557,564	559,910
18. Production Per Cow	(lbs.)	11,957	10,101	11,832	10,412
19. Dairy Investment	(\$)	86,714	58,426	78,820	64,211
20. Capital Turnover	(yrs.)	1.85	1.94	2.05	1.69

^{1/} Feed cost per cow, above or below the average of \$236.00, is the main determinant in the results listed in columns 1 and 2.

^{2/} Dairy investment, above or below the average of \$1,429.00 per cow, is the controlling factor in the results obtained in the third and fourth columns.

Table 2 CHARACTERISTICS OF 61 ALBERTA DAIRY ENTERPRISES
CLASSIFIED BY THE GROSS VALUE OF PRODUCTION PER COW &
THE NUMBER OF HOURS OF LABOUR PER HUNDREDWEIGHT OF MILK

1971

		Gross Value ^{1/} of Production Per Cow		Hours of Labour ^{2/}	
		Over \$759	Under \$759	Over .73 Hrs./Cwt.	Under .73 Hrs./Cwt.
Number of Farms		26	35	39	22
1. Milk Sales	(\$)	41,269	23,196	22,333	46,086
2. Total Value of Production	(\$)	52,240	27,720	27,089	57,816
3. Total Cost of Production	(\$)	42,655	25,690	25,296	46,438
4. Return to Op. Labour & Mgmt.	(\$)	12,884	5,249	5,240	14,286
5. Return to Management & Risk	(\$)	9,585	2,031	1,793	11,378
6. Receipts/Cwt. Milk Produced	(\$)	7.03	6.58	6.76	6.90
7. Feed Cost Per Cwt.	(\$)	2.09	2.16	2.07	2.17
8. Other Variables Per Cwt.	(\$)	0.99	0.99	1.02	0.95
9. Labour Per Cwt.	(\$)	(.64 hr) 1.13	(.84 hr) 1.36	(.95 hr) 1.53	(.54 hr) 0.98
10. Fixed Cost Per Cwt.	(\$)	1.52	1.59	1.68	1.43
11. Total Production Costs	(\$)	5.73	6.10	6.30	5.53
Returns to:					
12. Unpaid Labour, Mgmt. & Invest.	(\$)	2.66	2.41	2.49	2.60
13. Unpaid Labour & Management	(\$)	1.79	1.47	1.55	1.74
14. Operator's Labour & Management	(\$)	1.74	1.25	1.31	1.71
15. Management & Risk	(\$)	1.29	0.48	0.45	1.36
16. Number of cows	(no.)	61.1	42.3	39.5	69.5
17. Total Milk Production	(lbs.)	743,432	421,435	400,933	838,321
18. Production Per Cow	(lbs.)	12,172	9,970	10,161	12,066
19. Dairy Investment	(\$)	92,418	56,613	53,989	103,580
20. Capital Turnover	(yrs.)	1.77	2.04	1.99	1.79

^{1/} Productivity per cow, above or below the average of \$759.00, is the major factor identified with items in the first two columns.

^{2/} The labour time, above or below the average of .73 hours per hundredweight, is the controlling factor in the items in the third and fourth columns.

Herd Credit

Items that tended to increase Herd Credit in 1971 were sales of dairy cattle, transfers of dairy cattle to a beef herd, cattle slaughtered for home use or market purposes, an increase in herd value through growth, and a rising market price.

Items that tended to decrease Herd Credit in 1971 were transfers of beef heifers into the milking herd, purchases of dairy cattle, and a decrease in herd value through mortality.

Inventory increases in the sample dairy herds in 1971 constituted 34% of the Herd Credit in Edmonton, 57% in Calgary, 23% in Lethbridge - Medicine Hat and 41% in the sample group as a whole. Records from the respective areas showed these relationships.

	<u>Edmonton</u>		<u>Calgary</u>		<u>Lethbridge</u>		<u>All Areas</u>	
	\$	%	\$	%	\$	%	\$	%
<u>Inventory Increase</u>	1742		4863		2564		2757	
<u>Herd Credit</u>	5060	(34)	8487	(57)	11221	(23)	6778	(41)

Table 3 1971 CATTLE SALES & PURCHASES
(61 Dairy Farms)

<u>PURCHASES</u>				<u>SALES</u>			
	<u>No.</u>	<u>Value</u>	<u>Av. Value</u>		<u>No.</u>	<u>Value</u>	<u>Av. Value</u>
		\$	\$			\$	\$
<u>Edmonton</u>							
Milk Cows	38	14,911	392	Cows	338	87,346	258
Mature Heifers	44	12,317	280	Calves	549	34,422	63
<u>Calgary</u>							
Milk Cows	99	51,837	524	Cows	251	69,354	276
Mature Heifers	65	14,600	225	Calves	360	29,360	82
<u>Lethbridge</u>							
Milk Cows	13	5,250	404	Cows	118	28,984	246
Mature Heifers	---			Calves	148	13,133	89
<u>Alberta</u>							
Milk Cows	150	71,998	480	Cows	706	185,684	263
Mature Heifers	109	26,917	247	Calves	1057	76,915	73

